



# Volunteer Lake Assessment Program Individual Lake Reports

## LOON LAKE, PLYMOUTH, NH

### MORPHOMETRIC DATA

Watershed Area (Ac.):	2,240	Max. Depth (m):	8.8	Flushing Rate (yr <sup>-1</sup> )	2.6
Surface Area (Ac.):	112	Mean Depth (m):	3.9	P Retention Coef:	0.55
Shore Length (m):	2,600	Volume (m <sup>3</sup> ):	1,784,500	Elevation (ft):	489

### TROPHIC CLASSIFICATION

Year	Trophic class
1983	MESOTROPHIC
1999	MESOTROPHIC

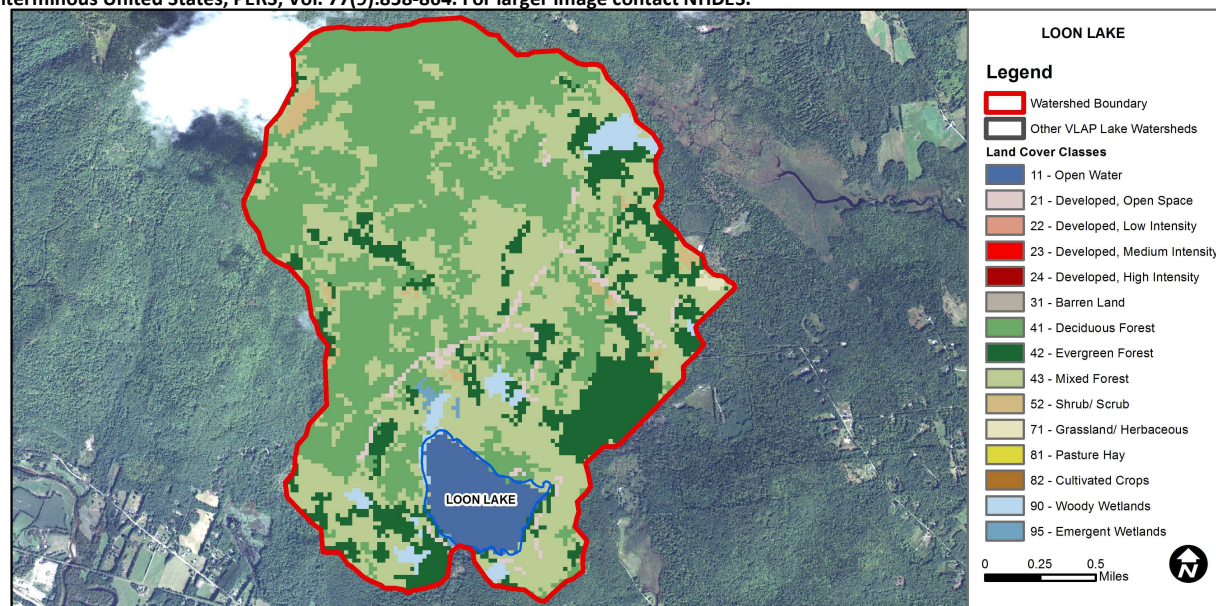
### KNOWN EXOTIC SPECIES


The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at [www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm](http://www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm)

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	Oxygen, Dissolved	Very Good	There are a total of at least 10 samples with 0 exceedances of criteria.
	Dissolved oxygen saturation	Cautionary	There are < 10 samples with 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Encouraging	There are no geometric means or there are > 2 single samples but those samples are within 75% of the geometric means criteria. More data needed.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

### WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	4.62	Barren Land	0	Grassland/Herbaceous	0.17
Developed-Open Space	1.61	Deciduous Forest	39.28	Pasture Hay	0
Developed-Low Intensity	0	Evergreen Forest	13.92	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	36.44	Woody Wetlands	2.4
Developed-High Intensity	0	Shrub-Scrub	1.26	Emergent Wetlands	0.29



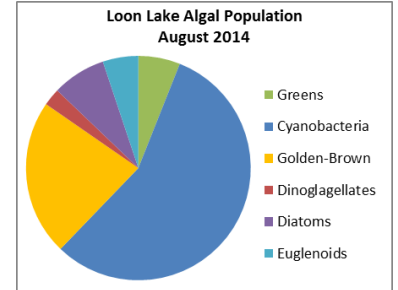
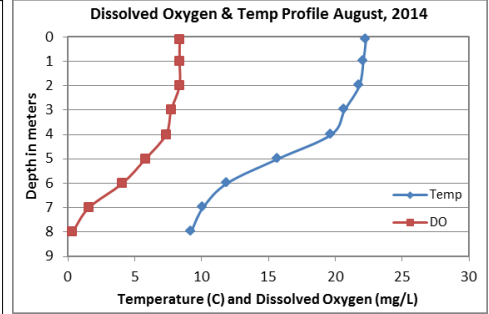
# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

## LOON LAKE, PLYMOUTH

### 2014 DATA SUMMARY

#### OBSERVATIONS AND RECOMMENDATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- ◆ **CHLOROPHYLL-A:** Chlorophyll levels remained low from June through September and were much less than the state median. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- ◆ **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity and/or chloride levels remained stable and low from June through September. Average epilimnetic (upper water layer) conductivity decreased from 2013 and was much less than the state median. Historical trend analysis indicates stable epilimnetic conductivity since monitoring began.
- ◆ **E. COLI:** Tributary E. coli levels were much less than the state standard of 406 cts/100 mL for surface waters. Beach E. coli levels were much less than the state standard of 88 cts/100 mL for public beaches.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic (upper water layer) and Metalimnetic (middle water layer) phosphorus levels increased from June to August and then decreased in September, and remained within low to average ranges. Average epilimnetic phosphorus remained stable from 2013 and less than the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus since monitoring began. We hope to see this continue! Hypolimnetic phosphorus was low in June and then increased to slightly above average levels in August and September likely due to the release of phosphorus from bottom sediments as the summer progressed and dissolved oxygen levels were depleted in the hypolimnion, a process called internal loading. Gargaz Inlet and Gargaz at Lake phosphorus levels were within an average range for that tributary. Outlet phosphorus levels were low. Mill Brook Inlet phosphorus levels were elevated in June following a significant storm event and flushing of upstream wetland/beaver systems.
- ◆ **TRANSPARENCY:** Transparency increased (improved) from June to August and then decreased slightly in September. Average transparency improved slightly from 2013 and was better than the state median. Historical trend analysis indicates relatively stable transparency with moderate variability since monitoring began.
- ◆ **TURBIDITY:** Epilimnetic turbidity was average in June, increased in August likely due to algal growth, and then decreased in September. Metalimnetic turbidity was also slightly above average and increased from June through September likely due to algal growth. Hypolimnetic turbidity was relatively stable and low from June through August and then increased in September potentially due to the accumulation of organic compounds in hypolimnetic waters as the summer progressed. Gargaz Inlet turbidity was in an average range for that station. Mill Brook Inlet turbidity was elevated, but within an average range for that station. Outlet turbidity was low.
- ◆ **pH:** Epilimnetic pH was generally within the desirable range 6.5-8.0 units, however metalimnetic and hypolimnetic pH levels were less than desirable. Historical trend analysis indicates highly variable epilimnetic pH since monitoring began.
- ◆ **RECOMMENDED ACTIONS:** Mill Brook Inlet phosphorus levels were elevated in June following a significant storm event. This station has a series of beaver dams upstream and likely contribute to the elevated phosphorus and/or sediment in the tributary during significant storm events. Gargaz Inlet phosphorus levels remained average in June following the storm event which is good news. Stabilize steep slopes by planting native vegetation and utilizing stormwater management techniques suggested in DES' "NH Homeowner's Guide to Stormwater Management". The improving epilimnetic phosphorus trend is encouraging and we hope to see this continue. Keep up the great work!



**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

**Chloride:** > 230 mg/L (chronic)

**E. coli:** > 88 cts/100 mL – public beach

**E. coli:** > 406 cts/100 mL – surface waters

**Turbidity:** > 10 NTU above natural level

**pH:** between 6.5-8.0 (unless naturally occurring)

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.

**Alkalinity:** 4.9 mg/L

**Chlorophyll-a:** 4.58 mg/m<sup>3</sup>

**Conductivity:** 40.0 uS/cm

**Chloride:** 4 mg/L

**Total Phosphorus:** 12 ug/L

**Transparency:** 3.2 m

**pH:** 6.6

Station Name	Table 1. 2014 Average Water Quality Data for LOON LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	4.27	2.08		24.8		8	3.38	3.71	1.29	6.55
Metalimnion				25.1		10			1.98	6.18
Hypolimnion				26.2		14			3.31	5.99
Gargaz At Lake				49.6	10	15			2.56	6.88
Gargaz Inlet			3	38.8	105	15			1.40	6.69
Mill Brook Beach				39.0	40	25			3.78	6.60
Mill Brook Inlet			3	23.6	95	42			3.28	6.37
Outlet In Stream				24.7	10	7			1.12	6.67

#### HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data show low variability.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Improving	Data significantly decreasing.

